U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 19EE7CE2PQ **Max Marks: 100**
Course: ELECTRICAL POWER QUALITY

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		Define Distributed Generation according to IEEE. What are the advantages and disadvantages of Distributed Generation.	*CO1*	*PO1*	**05**
	b)		Write a detailed note on IEC (International Electrotechnical Commission) 61000 series of standards.	*CO1*	*PO1*	**05**
	c)		Through ITIC curves, explain steady-state tolerances and Low-Frequency Decaying Ring wave	*CO1*	*PO1*	**05**
	d)		How the Power Quality Problems are classified based on its events? Write a short note.	*CO1*	*PO1*	**05**
			OR			
2	a)		Explain how power quality problems impact the performance that affect the users	*CO1*	*PO1*	**05**
	b)		How IEEE 519 sets limits on harmonic distortion and IEEE 1250 guides for service to equipment sensitive to momentary voltage disturbances.	*CO1*	*PO1*	**05**
	c)		Illustrate a typical CBEMA curve, showing how it maps voltage deviations against time duration to determine the equipment sensitivity.	*CO1*	*PO1*	**05**
	d)		What the power quality issues in Distributed generation. Explain any one in detail.	*CO1*	*PO1*	**05**
			UNIT – II			
3	a)		Write a short note on Power-Frequency Control in a power system? How it affects its power quality?	*CO2*	*PO1*	**05**
	b)		What is risk of under frequency Tripping?	*CO2*	*PO1*	**05**
	c)		What is Spinning reserve?	*CO2*	*PO1*	**05**
	d)		Elaborate on how Time deviation of clocks can alter power quality of a power system.	*CO2*	*PO1*	**05**
			OR			
4	a)		What is Over frequency tripping? How to avoid this tripping?			**05**

		b)	Explain any two key aspects in power balance of the power system			**05**
		c)	How do the variations in the speed of the motors, connected as loads in power systems, affect the power quality?			**05**
		d)	Explain how variations in voltage and frequency affect the performance and operation of electrical equipment.			**05**
			UNIT – III			
	5	a)	Differentiate between Harmonics and Transients in power quality analysis	*CO2*	*PO2*	**05**
		b)	What are triplen harmonics? Why Triplen Harmonics are Troublesome?	*CO2*	*PO2*	**05**
		c)	What are the disturbances coming under the term waveform distortion? Explain any one with neat figures.	*CO2*	*PO2*	**05**
		d)	What are the causes and effects of the power quality problems caused by the Short and Long duration voltage variations	*CO2*	*PO2*	**05**
			OR			
	6	a)	Define Harmonics and classify them with respect to its order.	*CO2*	*PO2*	**05**
		b)	Write a short note on Voltage Sag and the factors that cause voltage sag.	*CO2*	*PO2*	**05**
		c)	What is Overvoltage and Undervoltage? What are the causes for these voltage variations?	*CO2*	*PO2*	**05**
		d)	Explain voltage imbalance and voltage fluctuations	*CO2*	*PO2*	**05**
			UNIT – IV			
	7	a)	Interpret the Effect of harmonics distortions on Capacitors	*CO2*	*PO2*	**05**
		b)	Zig-Zag transformers are used in controlling harmonic distortions. Is this statement true? Justify your answer.	*CO2*	*PO2*	**05**
		c)	Determine the k rating of a transformer required to carry a load consisting of 200A of fundamental 100A of third harmonics 75A of fifth harmonics and 42A of seventh harmonics	*CO2*	*PO2*	**05**
		d)	Give a brief explanation about the single-phase power supply as commercial loads.	*CO2*	*PO2*	**05**
			OR			
	8	a)	Discuss the impact of harmonic distortion on Transformers	*CO2*	*PO2*	**05**
		b)	Consider a circuit which draws 12A of current at a voltage of 440V and at a power factor of 0.7 lagging. Calculate its active power, reactive power and apparent power.	*CO2*	*PO2*	**05**
		c)	With the help of magnetic ballast and electronic ballast, briefly explain about Fluorescent lighting	*CO2*	*PO2*	**05**
		d)	Discuss the reasons of grounding.	*CO2*	*PO2*	**05**
			UNIT – V			
	9	a)	Differentiate between Active Power Filters and Passive Power Filters	*CO2*	*PO2*	**05**
		b)	Explain how Multimeters are used to measure power quality?	*CO1*	*PO2*	**05**

		c)	Categorize and provide explanations for nonlinear loads, distinguishing between Solid State and Non-Solid-State types, accompanied by clear illustrations.	*CO2*	*PO2*	**05**
		d)	Write a brief note on Disturbance analyzers	*CO1*	*PO2*	**05**
			OR			
	10	a)	Explain the working principle of a flicker meter and how it measures voltage fluctuations that cause flicker	*CO2*	*PO2*	**05**
		b)	Classify non-linear loads based on the usage of converter. Explain any one in details with neat diagrams.	*CO1*	*PO2*	**05**
		c)	Explain the importance of harmonic filtering in maintain power quality and protecting equipment from damage due to harmonic distortion.	*CO2*	*PO2*	**05**
		d)	Write a brief note on wiring and grounding testers.	*CO1*	*PO2*	**05**

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